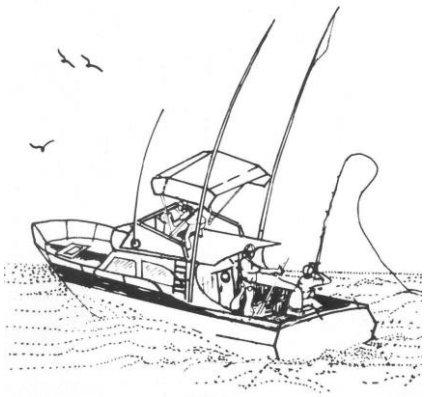
NOAA Technical Memorandum NMFS-SEFSC-682

THE PRICES FOR FOR-HIRE MARINE FISHING TRIPS IN THE SOUTHEASTERN U.S. COLLECTED FROM WEBSITES: 2011 - 2013

By

DAVID W. CARTER



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September 2015

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1 Introduction

Information on the prices for for-hire fishing services is needed to understand the economics of the industry. Prices are used along with data on for-hire fishing trip costs and effort to calculate the profitability of the sector. Longer price series can be used to estimate demand and supply relationships for for-hire services that help to predict how trip activity is expected to change with proposed regulations. We can learn a lot about how much different trip features are worth to anglers by examining the variation in prices for for-hire services over space and time Carter & Liese (2010). This is because the prices for for-hire fishing trips are determined in the market and vary depending on the demand for trips by anglers and the supply of trips provided by the for-hire industry. Changes in factors that affect the demand and supply of for-hire services will cause for-hire prices to change over time and space. Therefore, data on prices for multiple periods and geographic locations will allow for better economic analyses.

The U.S. National Marine Fisheries Service (NMFS) currently does not collect information about prices for for-hire services in the southeastern U.S. The only database with information on for-hire fishing prices at the *trip level* is from an economic add-on to the NMFS weekly telephone survey of for-hire operators from mid-2002 to mid-2003 Liese & Carter (2011). Recent work used in-person interviews with a sample of for-hire captains to get information on the prices on "typical" for-hire fishing trips for a given year Savolainen et al. (2012), Holland et al. (2012).

This report documents a novel way of collecting information on the prices and related characteristics of for-hire fishing operations. During the summers of 2011, 2012, and 2013 we collected price data from the websites of for-hire vessels permitted to operate in the federal waters of the southeastern U.S. This approach is in line with recent efforts that

use online prices to construct price indices that are more timely and, in some cases, more accurate than official price statistics Cavallo (2013).

Collecting price information from websites has many advantages over other data collection methods such as voluntary telephone, mail, or in-person surveys. Information on the World Wide Web is accessible to the public; thus, data regarding for-hire fishing vessel services are readily available. For-hire operators have an incentive to provide current information about their services to compete for potential customers. The data on the Internet can be collected as soon as the data entry form has been designed. Compare this with the substantial delays for other survey work associated with getting clearance via the Paperwork Reduction Act or institutional review boards.

Finding and recording information on the Internet is relatively inexpensive. Labor is the primary cost and information can be gathered at any hour of the day. This too may result in acquiring the data sooner than other survey techniques. The process to update records can be repeated at anytime.

A website data collection may also avoid the issues of noncompliance and refusal that plague mail and phone surveys. Consequently, this type of approach may produce larger sample sizes and more accurate depictions of charter operations compared to other common forms of data collection.

There are also several methodological challenges associated with collecting for-hire price information from websites. The most prevalent issue is that some operators do not have a website or do not provide all of the required information on their website, specifically the prices. This can lead to a form of sample and item non-response bias when attempting to construct population statistics. Operators may not reveal prices online because of seasonal variation, fuel price volatility, or competition with other charters. In these cases, it may be necessary to call for charter prices or find a way to correct for sample

biases. Prices provided online may not be up-to-date or may not reflect the true cost of trips because they do not take into account fuel surcharges, fillet fees, or other hidden costs. Another disadvantage is that some information provided by for-hire operators' websites can be difficult to organize in a structured database. Lastly, the "retail" prices posted on websites may differ from prices for trips that are negotiated between customers and for-hire operators.

The remainder of this report documents the methods and results of the Internet data collection of for-hire prices in the Gulf of Mexico and South Atlantic. We use the terms "Gulf of Mexico" and "South Atlantic" to refer to the jurisdictions of the fishery management councils with the same name. The South Atlantic Fishery Management Council is responsible for the conservation and management of fish stocks within the federal 200-mile limit of the Atlantic off the coasts of North Carolina, South Carolina, Georgia and east Florida to Key West. The Gulf of Mexico Fishery Management Council manages fishery resources from where the marine waters of Texas, Louisiana, Mississippi, Alabama, and west Florida end, out to the federal 200-mile limit.

The intent of the report is to document the process and to present key summary statistics. As such, the discussion of the results is brief and limited to comparing estimates of average prices to estimates from other recent data collections in the southeastern U.S. Later work will attempt to further interpret the results and use the database for more extensive analyses of the for-hire market in the southeastern U.S.[1]

[1]All calculations and graphics for this report were generated using **R** R Core Team (2014) and the report was written using `knitr` Xie (2013).

2 Methods

We collected data for two types of for-hire vessels: charter boats and headboats. Charter boats charge by the boat whereas headboats charge per person. However, there are some vessels that use both of these pricing structures. We identified a headboat as any vessel that is included in the Southeast Headboat Survey.[2] The remaining vessels were treated as charter boats. For charter boats, we focus on the prices for charter vessels operating under the U.S. Coast Guard National Operator of Uninspected Passenger Vessel (OUPV) license for boats less than 100 GRT (usually less than 65 feet). This is the license commonly used by uninspected passenger vessels which by law are limited to six or less passengers for hire. According to the license definition "these are usually smaller vessels and normally engage in charter fishing, whale watching, SCUBA diving, and tour cruises."[3]

A master list of for-hire fishing boats was compiled in 2011 for the South Atlantic and 2012 for the Gulf of Mexico consisting of vessels that had at least one of the following federal permits:

- Atlantic dolphin-wahoo charter/headboat,
- South Atlantic coastal migratory pelagic charter/headboat,
- South Atlantic snapper-grouper charter/headboat,
- Gulf of Mexico charter/headboat for coastal migratory pelagics, and
- Gulf of Mexico charter/headboat for reef fish.

[2] http://www.sefsc.noaa.gov/labs/beaufort/sustainable/headboat/
[3] http://www.uscg.mil/nmc/credentials/charter_boat_capt/

The permit files were obtained from the NOAA Fisheries Southeast Regional Office (SERO) Freedom of Information Act website.[4] The permit files included information on the vessel name and mailing address that could be used to search the Internet to find the website of each operation if one existed. We subsequently obtained additional information for the permited vessels for 2011 through 2014 from the SERO permit office. This information was used to verify the data on vessel characteristics that we collected via the websites.

The data collection proceeded in two different phases based on for-hire vessel type and the region of operation. During 2011 and 2012, student interns from the University of Miami recorded price and product information from the websites of federally permitted charter and headboat fishing vessels in the South Atlantic, including Florida (east coast), Georgia, South Carolina, and North Carolina. In 2012 and 2013, another student and a contractor (former student) updated the South Atlantic records and populated the database with information about for-hire operations in the Gulf of Mexico, Florida (west coast), Alabama, Mississippi, Louisiana, and Texas.

In additional to information about trip prices, the following information was recorded, if it was listed on a vessel website: vessel capacity, length and horsepower, home port and marina of operation, along with a list of popular game fish that the vessel targets. Ten groups of commonly caught fishes were established: dolphin, wahoo, groupers, snappers, mackerels, billfish, permit, jacks, cobia, and tuna. A full data dictionary is available in the Appendix. This report focuses on the prices recorded in the database. The other information recorded from the websites may be explored in future reports.

The following information about the price structure was collected: trip price, length of trip, number of passengers included in the price, the location or type of trip (offshore,

[4] http://sero.nmfs.noaa.gov/operations_management_information_services/constituency_services_branch/freedom_of_information_act/common_foia/index.html

inshore, nearshore, or bottom), whether or not the price included filleting of caught fish, and whether or not there was a fuel surcharge not included in the price. Charter prices were recorded as the cost of hiring the vessel out as a whole whereas prices for headboats were recorded as the price per individual. Note that some OUPV six-passenger vessels listed the price for less than six passengers along with a cost per each additional passenger up to six. We used this information to standardize the price for these vessels to include six passengers. For example, a website might have listed a half-day trip price of $300 for up to four passengers and $50 for each additional passenger. In this case we would standardize the cost of the trip for six passengers as $\$300 + 2 * \$50 = \$400$. There were also some OUPV six-passenger vessels that charged per person. We scaled the prices for these vessels to the price for six passengers.

The price of charter trips generally vary according to the length of the trip with 4 hours (1/2 day), 6 hours (3/4 day), 8 hours (full day), 10 hours (full + 2), and 12 hours (full + 4) among the most common durations. Similarly, the price of headboat trips generally vary according to the length of the trip with 3-5 hours (1/2 day), 6-7.5 hours (3/4 day), and 8-9 hours (full day), and 10-12 hours (full day +) among the most common durations. We report the summary statistics for the prices associated with these common trip durations for charter and headboat operations.

There are other factors that influence the price of charter and headboat trips. Our examination of charter boat websites suggests that the prices can vary by home port state, trip type (offshore, inshore, nearshore, or bottom), and whether or not all fuel is included. We evaluate the contribution of these factors to the variation in charter prices using a hedonic regression Carter & Liese (2010). A hedonic regression is an econometric approach to estimating the relative value of different product characteristics. For example, for the Gulf of Mexico we estimate the parameters of the following equation using ordinary least

squares:

$$
\begin{aligned}
price_{ij} = {} & \beta 0 + \beta 1 \cdot hours_{ij} + \beta 2 \cdot StateFL_{ij} + \beta 3 \cdot StateLA_{ij} + \beta 4 \cdot StateMS_{ij} \\
& + \beta 5 \cdot StateTX_{ij} + \beta 12 \cdot hours_{ij} \cdot StateFL_{ij} + \beta 13 \cdot hours_{ij} \cdot StateLA_{ij} \\
& + \beta 14 \cdot hours_{ij} \cdot StateMS_{ij} + \beta 15 \cdot hours_{ij} \cdot StateTX_{ij} + \beta 6 \cdot VesselFt_{ij} \\
& + \beta 7 \cdot fuelextra_{ij} + \beta 8 \cdot offshore_{ij} + \beta 9 \cdot nearshore_{ij} \\
& + \beta 10 \cdot inshore_{ij} + \beta 11 \cdot bottom_{ij} + \epsilon_{ij}
\end{aligned}
$$

where, for trip i offered on vessel j, $price_{ij}$ is the price; $hours_{ij}$ is the duration; $StateFL_{ij}$, $StateLA_{ij}$, $StateMS_{ij}$, and $StateTX_{ij}$ each equal to one for trips originating in the corresponding state and zero otherwise; $VesselFt_{ij}$ is the length of the vessel; $fuelextra_{ij}$ equals one if the website indicates separate charges for fuel; $offshore_{ij}$, $nearshore_{ij}$, $inshore_{ij}$, and $bottom_{ij}$ each equal one if the website indicates that the trip goes to the corresponding ocean area; the β terms are parameters to be estimated; and ϵ_{ij} is an error term. The β parameters measure the relative contribution of the factor to the average price of a trip. The indicator for trips originating from Alabama is taken as the base such that all state effects are relative to Alabama. This was simply because Alabama comes first alphabetically. We also include the interaction between the hours and the state indicators to allow for the effect of trip duration on price to vary by state. To simplify the interpretation of the regression coefficients we standardize the continuous regressors (Hours and VesselFt) by subtracting off the grand mean. In this case, the intercept is the average price in the base state for the average length trip on the average length vessel for which the website does not indicate separate charges for fuel or specific trip types (offshore, nearshore, inshore or bottom). It is important to note that the trip type factors are simply used to control for trip prices where a type was explicit on the website. Not

all vessels differentiated prices by trip type.

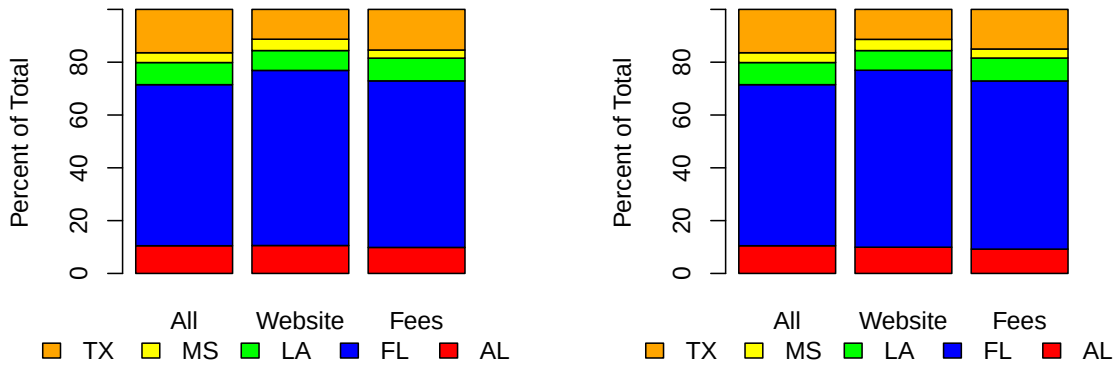
We estimate the above equation for each year in which data for the Gulf of Mexico is available. We also estimate the same equation for each year of data in the South Atlantic, replacing the state indicator variables with indicators for Georgia, North Carolina, and South Carolina with east Florida taken as the base. There is not sufficient data to estimate a hedonic regression for each year of headboat data in the Gulf of Mexico or South Atlantic.

3 Gulf of Mexico

3.1 Charter Boats

There were 1187 charter vessels with Gulf of Mexico charter/headboat permits to harvest coastal migratory pelagic fish or reef fish in the summer of 2012. Removing vessels with home ports outside the Gulf of Mexico leaves 1182 permitted vessels. The search for websites and price information was conducted using this same set of permitted vessels during 2012 and 2013. We found websites for 558 of these charter vessels in 2012 and for 564 in 2013. Of the vessels with websites in 2012, 386 had price information on the website as did 386 vessels with websites in 2013. The distribution of all permitted vessels by state is shown in Figure 1 for 2012 and 2013. Note that the distribution across states of permitted vessels with price information is similar to the distribution for all permitted vessels. Also, the distribution is very similar between years because both years began from the 2012 permitted vessel list.

Of the charter boats with price information on their website, 264 vessels in 2012 and 249 vessels in 2013 offered prices that included up to six passengers on a charter. Collectively, these vessels provided 712 price observations in 2012 and 927 in 2013.



(a) 2012 (b) 2013

Figure 1: Permitted Charter Vessels in Gulf of Mexico by State and Information Found

Tables 1 and 2 show the summary statistics for the prices on charter boat vessels by trip duration in the Gulf of Mexico in 2012 and 2013, respectively. The estimates in the tables are relatively close to the 2009 estimates for the Gulf of Mexico in 2013 dollars: half-day=$606 and full-day=$1067.[5]

Table 1: 2012 6-Passenger Charter Prices by Trip Duration in the Gulf of Mexico

Duration (Hours)	N	Mean	St. Dev.	Min	Median	Max
4 (1/2 day)	172	614	110	350	600	1,000
6 (3/4 day)	190	854	173	450	800	1,450
8 (full day)	201	1,114	245	550	1,100	2,000
10 (full + 2)	64	1,471	474	900	1,350	4,500
12 (full + 4)	34	1,964	808	1,000	1,800	5,500

The summary statistics for the model variables of the hedonic price regressions for

[5]The estimates are from Table 3.5 in Savolainen et al. Savolainen et al. (2012) and converted from 2009 to 2013 dollars using a factor of 1.09 based on the CPI calculator at `http://data.bls.gov/cgi-bin/cpicalc.pl`.

Table 2: 2013 6-Passenger Charter Prices by Trip Duration in the Gulf of Mexico

Duration (Hours)	N	Mean	St. Dev.	Min	Median	Max
4 (1/2 day)	172	613	125	300	600	1,000
6 (3/4 day)	181	868	219	350	810	2,200
8 (full day)	208	1,130	280	400	1,100	2,200
10 (full + 2)	100	1,542	421	800	1,500	4,500
12 (full + 4)	92	1,929	605	500	1,900	5,500

2012 and 2013 are shown in Tables 3 and 4 and the results are shown in Table 5.[6] Note that a few records were dropped each year (i.e., the N is less than the number of price observations available) due to missing information, mainly on vessel length. Also, in 2012 we did not record any prices that were associated with inshore or bottom fishing trips. This was partly because we were still refining the method used to identify the trip type associated with rates. Consequently, the inshore and bottom factors were excluded from the hedonic regression for 2012.

The hedonic regressions explain more than 80 percent of the variation in prices in both years. We standardized Hours and VesselFt in each year by subtracting off the mean of the annual sample from each observation. Therefore, the intercept represents the expected price for a trip of average duration on an vessel of average length departing from Alabama that does not list separate charges for fuel or different trip types (offshore, nearshore, inshore, bottom). This amount is $1,182 in 2012 and $1,498 in 2013. Trips from Florida and Mississippi are relatively less expensive than those in Alabama and trips from Louisiana and Texas are relatively more expensive.

On average, each additional hour of a trip adds around $150 to the price in each year for trips in Alabama. Trips from the other states cost around $30 less per hour than

[6]The tables displaying the summary statistics and results of all regressions reported in this document were created using the `stargazer` Hlavac (2014) and `texreg` Leifeld (2013) packages for **R** R Core Team (2014).

trips from Alabama. Larger boats charge more per trip at a rate of about $20 per foot. Vessels that do not include all fuel costs in the price listed prices that were nearly $250 less on average in 2012 and more than $450 more in 2013. There does not appear to be a significant different in prices for which we identified specific trip types on the websites in 2012. However, this could be because the data entry process was still developing and we did not identify these trip types as carefully in 2012 as in 2013. In 2013, the price was more than $160 extra on average for trips identified on the website as offshore and more than $300 on average for prices associated with bottom fishing trips. Prices associated with nearshore trips in 2013 were over $200 less on average.

Table 3: Summary Statistics for the 2012 Hedonic Regression using the 6-Passenger Charter Prices in the Gulf of Mexico

Statistic	N	Mean	St. Dev.	Min	Median	Max
Fee	711	1,078.04	693.47	350	900	6,500
Hours	711	7.49	4.92	3.00	6.00	60.00
StateFL	711	0.69	0.46	0	1	1
StateLA	711	0.05	0.21	0	0	1
StateMS	711	0.03	0.16	0	0	1
StateTX	711	0.11	0.31	0	0	1
VesselFt	711	34.81	8.47	13	35	63
fuelextra	711	0.06	0.24	0	0	1
offshore	711	0.01	0.07	0	0	1
inshore	711	0.00	0.00	0	0	0
nearshore	711	0.003	0.05	0	0	1
bottom	711	0.00	0.00	0	0	0
Hours:StateFL	711	4.75	4.48	0.00	4.00	52.00
Hours:StateLA	711	0.48	2.46	0	0	24
Hours:StateMS	711	0.17	1.12	0	0	12
Hours:StateTX	711	1.14	4.27	0	0	60

Table 4: Summary Statistics for the 2013 Hedonic Regression using the 6-Passenger Charter Prices in the Gulf of Mexico

Statistic	N	Mean	St. Dev.	Min	Median	Max
Fee	909	1,342.17	987.57	200	1,050	9,500
Hours	909	9.05	6.81	2.00	8.00	72.00
StateFL	909	0.72	0.45	0	1	1
StateLA	909	0.03	0.16	0	0	1
StateMS	909	0.03	0.16	0	0	1
StateTX	909	0.11	0.31	0	0	1
VesselFt	909	35.81	8.28	13	36	63
fuelextra	909	0.04	0.21	0	0	1
offshore	909	0.06	0.24	0	0	1
inshore	909	0.04	0.20	0	0	1
nearshore	909	0.03	0.16	0	0	1
bottom	909	0.02	0.15	0	0	1
Hours:StateFL	909	6.15	6.70	0.00	6.00	72.00
Hours:StateLA	909	0.38	2.59	0	0	24
Hours:StateMS	909	0.20	1.29	0	0	12
Hours:StateTX	909	1.20	4.65	0.00	0.00	60.00

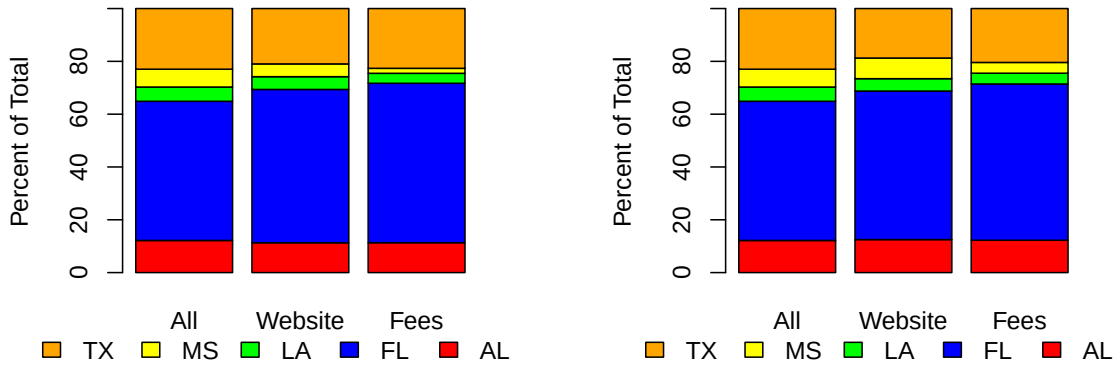
Table 5: Hedonic Regressions with the 2012 and 2013 6-Passenger Charter Prices in the Gulf of Mexico

	2012	2013
(Intercept)	1182.49***	1498.90***
	(30.78)	(38.83)
Hours	140.57***	151.06***
	(5.83)	(6.78)
StateFL	−160.85***	−228.04***
	(33.61)	(42.49)
StateLA	122.84	410.27**
	(69.22)	(126.67)
StateMS	−243.66**	−292.10**
	(79.53)	(105.48)
StateTX	226.33***	135.60*
	(48.85)	(60.18)
Hours:StateFL	−32.59***	−39.31***
	(6.79)	(7.23)
Hours:StateLA	−32.69**	−35.59*
	(11.44)	(14.35)
Hours:StateMS	−29.94	−29.13
	(31.51)	(32.94)
Hours:StateTX	−35.73***	−30.07***
	(7.15)	(8.20)
VesselFt	17.81***	23.14***
	(1.36)	(1.86)
fuelextra	−245.56***	−454.38***
	(53.09)	(77.79)
offshore	149.39	163.33**
	(208.77)	(62.97)
nearshore	−400.00	−217.03*
	(294.57)	(93.32)
inshore		−81.80
		(74.08)
bottom		319.74**
		(97.62)
R^2	0.82	0.83
Adj. R^2	0.82	0.82
Num. obs.	711	909
RMSE	294.57	414.64

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

3.2 Headboats

There were 75 headboat vessels with Gulf of Mexico charter/headboat permits to harvest coastal migratory pelagic fish or reef fish in the summer of 2012. Removing vessels with home ports outside the Gulf of Mexico leaves 74 permitted vessels. The search for websites and price information was conducted using this same set of permitted vessels during 2012 and 2013. We found websites for 62 of these headboat vessels in 2012 and for 64 in 2013. Of the vessels with websites in 2012, 50 had price information on the website as did 51 vessels with websites in 2013. The distribution of all permitted vessels by state is shown in Figure 2 for 2012 and 2013. Note that the distribution across states of permitted vessels with price information is similar to the distribution for all permitted vessels. Also, the distribution is very similar between years because both years began from the 2012 permitted vessel list.



(a) 2012 (b) 2013

Figure 2: Permitted Headboat Vessels in Gulf of Mexico by State and Information Found

Tables 6 and 7 show the summary statistics for the prices on headboat vessels by trip duration in the Gulf of Mexico in 2012 and 2013, respectively. The most recent study of headboat operations Savolainen et al. (2012) provides estimates of average revenue per passenger on a typical trip in the Gulf of Mexico which might be compared with our average price estimates. However, the study's definition of headboats is considerably different than the definition we use making the estimates incomparable. The only other estimate of average headboat prices in the Gulf of Mexico is from a survey completed in 1998 Sutton et al. (1999). These estimates are similar once adjusted from 1998 to 2013 dollars using the CPI factor of 1.43: half-day=$59 and full-day=$92.

Table 6: 2012 Headboat Prices by Trip Duration in the Gulf of Mexico

Duration (Hours)	N	Mean	St. Dev.	Min	Median	Max
3-5 hours (1/2 day)	34	51	12	25	54	79
6-7.5 hours (3/4 day)	18	69	13	60	65	110
8-9 hours (full day)	28	79	15	60	74	125
10-12 hours (full+)	20	91	16	70	85	120

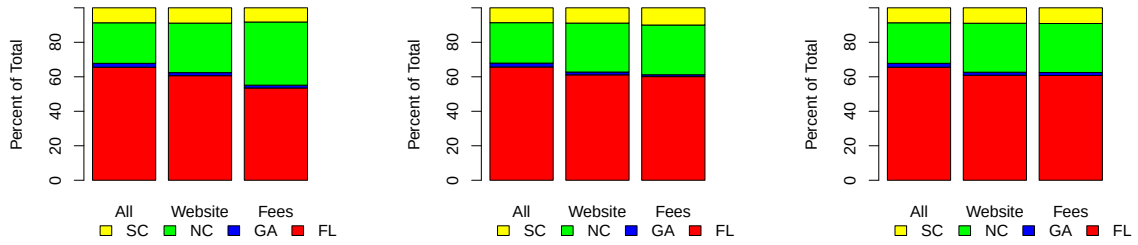
Table 7: 2013 Headboat Prices by Trip Duration in the Gulf of Mexico

Duration (Hours)	N	Mean	St. Dev.	Min	Median	Max
3-5 hours (1/2 day)	37	53	13	25	55	80
6-7.5 hours (3/4 day)	22	72	13	60	65	110
8-9 hours (full day)	32	80	17	60	75	125
10-12 hours (full+)	21	95	16	75	90	127

4 South Atlantic

4.1 Charter Boats

There were 1345 charter vessels with South Atlantic charter/headboat permits to harvest coastal migratory pelagic fish or reef fish in the summer of 2011. Removing vessels with home ports outside the South Atlantic leaves 1243 permitted vessels. The search for websites and price information was conducted using this same set of permitted vessels during 2011, 2012 and 2013. We found websites for 564 of these charter vessels in 2011, for 553 in 2012, and for 514 in 2013. Of the vessels with websites in 2011, 256 had price information on the website as did 388 vessels with websites in 2012, and 361 vessels with websites in 2013. The distribution of all permitted vessels by state is shown in Figure 3 for 2011, 2012, and 2013. Note that the distribution across states of permitted vessels with price information is similar to the distribution for all permitted vessels. Also, the distribution is very similar between years because all three years began from the 2011 permitted vessel list.



(a) 2011 (b) 2012 (c) 2013

Figure 3: Permitted Charter Vessels in South Atlantic by State and Information Found

Of the charter boats with price information on their website, 186 vessels in 2011, 246

vessels in 2012, and 225 vessels in 2013 offered prices that included up to six passengers on a charter. Collectively, these vessels provided 475 price observations in 2011, 656 in 2012 and 614 in 2013.

Tables 8, 9, and 10 show the summary statistics for the prices on charter boat vessels by trip duration in the South Atlantic in 2011, 2012 and 2013, respectively. The estimates in the tables are similar to the 2009 estimates for the South Atlantic in 2013 dollars: half-day=$601 and full-day=$1196.[7] These estimates are slightly higher than our half and full day average prices, likely because the average trip duration for half and full day trips in the study is relatively long at 4.6 and 9.4 hours, respectively.

Table 8: 2011 6-Passenger Charter Prices by Trip Duration in the South Atlantic

Duration (Hours)	N	Mean	St. Dev.	Min	Median	Max
4 (1/2 day)	93	582	136	240	600	1,100
6 (3/4 day)	69	833	176	600	800	1,500
8 (full day)	115	1,056	252	312	1,000	1,700
10 (full + 2)	32	1,172	239	800	1,100	1,950
12 (full + 4)	30	1,510	420	800	1,375	2,450

Table 9: 2012 6-Passenger Charter Prices by Trip Duration in the South Atlantic

Duration (Hours)	N	Mean	St. Dev.	Min	Median	Max
4 (1/2 day)	133	591	135	350	600	1,100
6 (3/4 day)	99	800	181	500	775	2,000
8 (full day)	163	1,025	228	480	1,000	1,700
10 (full + 2)	42	1,219	248	800	1,200	1,850
12 (full + 4)	40	1,589	491	840	1,488	2,900

The summary statistics for the model variables of the hedonic price regressions for 2011, 2012, and 2013 are shown in Tables 11, 12, and 13 and the results are shown in

[7]The estimates are from Table 102 in Holland et al. Holland et al. (2012) and converted from 2009 to 2013 dollars using a factor of 1.09 based on the CPI calculator.

Table 10: 2013 6-Passenger Charter Prices by Trip Duration in the South Atlantic

Duration (Hours)	N	Mean	St. Dev.	Min	Median	Max
4 (1/2 day)	125	589	121	360	600	900
6 (3/4 day)	96	812	175	550	778	2,000
8 (full day)	152	1,033	243	480	1,000	1,750
10 (full + 2)	37	1,225	226	850	1,200	1,750
12 (full + 4)	38	1,632	497	840	1,530	2,900

Table 14. Some records were dropped in each year because of missing information, mainly on vessel length. Also, we did not record any prices that had extra fuel charges in 2011 or that were associated with nearshore trips in any of the years. Again, this likely is due to the early data collection procedures. These factors do not appear in the hedonic regressions.

The hedonic regressions in 2012 and 2013 explain around 80 percent of the variation in prices. More noise is expected in the 2011 data because this was the inaugural year of the data collection. We standardized Hours and VesselFt in each year by subtracting the mean of the annual sample from each observation. Therefore, the intercept represents the expected price for a trip of average duration on an vessel of average length departing from east Florida that does not list separate charges for fuel or different trip types. This amount is around $900 in all years. Trips from South Carolina are relatively more expensive by a significant amount than those in east Florida in all years. However, price for the average trip from Georgia and North Carolina is not significantly different than those in east Florida, except for a small difference for North Carolina in 2012.

On average, each additional hour of a trip adds around $70 to the price in each year for trips in east Florida. Trips from North Carolina cost around $30 more per hour and trips from South Carolina cost at least $70 more per hour on average than trips from east Florida. Larger boats charge more per trip at a rate of about $15 per foot. There

does not appear to be a significant difference in prices associated with specific trip types (except inshore trips in 2012) or for prices that do not include all fuel costs in the price. Again, this could be due to "growing pains" in the data collection process or the limited amount of information presented regarding trip types on the websites of operators in the South Atlantic.

Table 11: Summary Statistics for the 2011 Hedonic Regression using the 6-Passenger Charter Prices in the South Atlantic

Statistic	N	Mean	St. Dev.	Min	Median	Max
Fee	473	966.63	428.40	240	900	3,600
Hours	473	7.91	6.65	3.00	8.00	96.00
StateGA	473	0.03	0.18	0	0	1
StateNC	473	0.33	0.47	0	0	1
StateSC	473	0.10	0.31	0	0	1
VesselFt	473	41.15	8.61	23.00	41.00	61.00
fuelextra	473	0.00	0.00	0	0	0
offshore	473	0.004	0.06	0	0	1
inshore	473	0.002	0.05	0	0	1
nearshore	473	0.00	0.00	0	0	0
bottom	473	0.002	0.05	0	0	1
Hours:StateGA	473	0.30	1.80	0	0	16
Hours:StateNC	473	3.04	7.14	0.00	0.00	96.00
Hours:StateSC	473	0.78	2.46	0.00	0.00	12.00

Table 12: Summary Statistics for the 2012 Hedonic Regression using the 6-Passenger Charter Prices in the South Atlantic

Statistic	N	Mean	St. Dev.	Min	Median	Max
Fee	654	935.51	425.74	350	850	3,800
Hours	654	7.25	3.55	3.00	7.00	48.00
StateGA	654	0.01	0.09	0	0	1
StateNC	654	0.29	0.45	0	0	1
StateSC	654	0.12	0.33	0	0	1
VesselFt	654	38.12	9.37	14.00	36.00	61.00
fuelextra	654	0.02	0.14	0	0	1
offshore	654	0.02	0.15	0	0	1
inshore	654	0.01	0.11	0	0	1
nearshore	654	0.00	0.00	0	0	0
bottom	654	0.01	0.08	0	0	1
Hours:StateGA	654	0.06	0.74	0	0	12
Hours:StateNC	654	2.31	4.09	0.00	0.00	35.00
Hours:StateSC	654	0.91	2.62	0.00	0.00	12.00

Table 13: Summary Statistics for the 2013 Hedonic Regression using the 6-Passenger Charter Prices in the South Atlantic

Statistic	N	Mean	St. Dev.	Min	Median	Max
Fee	614	972.40	495.92	350	850	5,000
Hours	614	7.54	4.84	3.00	7.00	72.00
StateGA	614	0.02	0.13	0	0	1
StateNC	614	0.30	0.46	0	0	1
StateSC	614	0.09	0.29	0	0	1
VesselFt	614	37.77	9.54	15.00	36.00	61.00
fuelextra	614	0.02	0.15	0	0	1
offshore	614	0.02	0.15	0	0	1
inshore	614	0.01	0.11	0	0	1
nearshore	614	0.00	0.00	0	0	0
bottom	614	0.005	0.07	0	0	1
Hours:StateGA	614	0.14	1.09	0	0	12
Hours:StateNC	614	2.51	4.30	0.00	0.00	35.00
Hours:StateSC	614	0.70	2.46	0.00	0.00	24.00

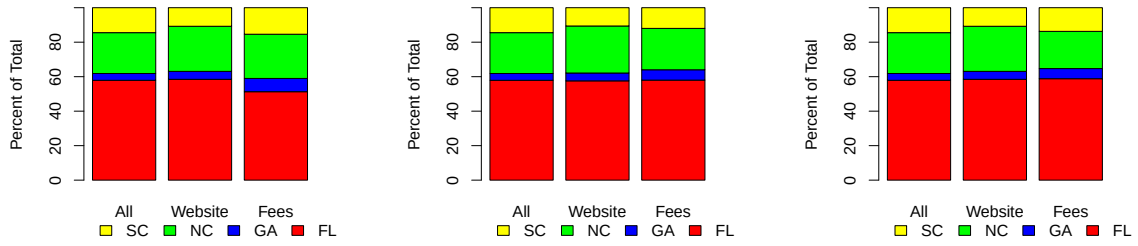
Table 14: Hedonic Regressions with the 2011, 2012, and 2013 6-Passenger Charter Prices in the South Atlantic

	2011	2012	2013
(Intercept)	952.97***	917.61***	943.84***
	(17.53)	(10.16)	(10.91)
Hours	69.61***	75.36***	67.34***
	(4.00)	(2.71)	(1.95)
StateGA	97.79	−62.64	66.47
	(79.98)	(90.05)	(68.00)
StateNC	22.01	−37.78*	−8.32
	(28.87)	(17.75)	(18.79)
StateSC	257.19***	199.58***	251.20***
	(44.09)	(24.40)	(29.40)
Hours:StateGA	48.12*	−1.42	34.62
	(19.57)	(30.68)	(21.97)
Hours:StateNC	−52.05***	27.44***	38.43***
	(4.58)	(4.81)	(4.46)
Hours:StateSC	72.04***	75.35***	91.26***
	(14.98)	(8.63)	(8.16)
fuelextra		7.72	15.42
		(52.38)	(60.53)
VesselFt	14.21***	15.05***	13.34***
	(1.58)	(0.88)	(0.94)
offshore	−21.63	−31.55	−61.17
	(196.88)	(51.02)	(55.36)
inshore	−431.58	−142.62*	−149.30
	(274.00)	(69.08)	(77.36)
bottom	78.37	−39.87	40.03
	(275.24)	(97.67)	(117.58)
R^2	0.61	0.80	0.84
Adj. R^2	0.60	0.79	0.83
Num. obs.	473	654	614
RMSE	272.00	193.12	202.25

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

4.2 Headboats

There were 82 headboat vessels with South Atlantic charter/headboat permits to harvest coastal migratory pelagic fish or reef fish in the summer of 2011. Removing vessels with home ports outside the South Atlantic leaves 76 permitted vessels. The search for websites and price information was conducted using this same set of permitted vessels during 2011, 2012 and 2013. We found websites for 65 of these headboat vessels in 2011, for 66 in 2012, and for 65 in 2013. Of the vessels with websites in 2011, 31 had price information on the website as did 42 vessels with websites in 2012, and 42 vessels with websites in 2013. The distribution of all permitted vessels by state is shown in Figure 4 for 2011, 2012, and 2013. Note that the distribution across states of permitted vessels with price information is similar to the distribution for all permitted vessels. Also, the distribution is very similar between years because all three years began from the 2011 permitted vessel list.



(a) 2011 (b) 2012 (c) 2013

Figure 4: Permitted Headboat Vessels in South Atlantic by State and Information Found

Tables 15, 16 and 17 show the summary statistics for the prices on headboat vessels by trip duration in the South Atlantic in 2011, 2012 and 2013, respectively. The estimates in the tables are similar to the 2009 estimates of average price revenue per passenger for

the Gulf of Mexico in 2013 dollars: half-day=$42 and full-day=$78.[8]

Table 15: 2011 Headboat Prices by Trip Duration in the South Atlantic

Duration (Hours)	N	Mean	St. Dev.	Min	Median	Max
3-5 hours (1/2 day)	18	49	10	37	48	66
6-7.5 hours (3/4 day)	8	56	13	30	60	75
8-9 hours (full day)	11	85	20	40	85	120
10-12 hours (full+)	7	107	23	90	100	140

Table 16: 2012 Headboat Prices by Trip Duration in the South Atlantic

Duration (Hours)	N	Mean	St. Dev.	Min	Median	Max
3-5 hours (1/2 day)	29	47	10	35	40	70
6-7.5 hours (3/4 day)	13	57	11	35	60	75
8-9 hours (full day)	14	81	20	40	80	120
10-12 hours (full+)	8	112	19	95	100	140

Table 17: 2013 Headboat Prices by Trip Duration in the South Atlantic

Duration (Hours)	N	Mean	St. Dev.	Min	Median	Max
3-5 hours (1/2 day)	29	47	10	37	45	70
6-7.5 hours (3/4 day)	15	60	11	35	65	75
8-9 hours (full day)	13	82	20	40	80	120
10-12 hours (full+)	9	111	18	100	100	140

[8]The estimates of the price per passenger are calculated as the average total revenues on a typical trip from Table 102 divided by the average total passengers on a typical trip from Table 86 in Holland et al. Holland et al. (2012). The estimates are converted from 2009 to 2013 dollars using a factor of 1.09 based on the CPI calculator.

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5 Appendix: Data Dictionary

Variable	Type	Label	Category	Sheet(s)	Notes
found	Character	Indicates whether the record could initially be located on the internet.	x, c, -8, dive, closed, d	fhpm	
CheckUpdate	Character	Indicates whether the vessel could be located by future internet searches.	x, c, -8, dive, closed, d	fhpm	
Beaufort Headboat Survey	Numeric	Indicates whether the vessel appears on a separate headboat survey.	1, 0, 1*	fhpm	Did not include header in South Atlantic data
Vessel ID	Character	Indicates an identification code specific to each vessel.	n/a	fhpm, vessel, fees	
Vessel Name	Character	States the name of the vessel.	n/a	fhpm	
Mail Recipient	Character	States the name of the individual who serves as the primary contact for the vessel.	n/a	fhpm	
Address	Character	States the number and name of the street where the mail recipient can be located.	n/a	fhpm	
City	Character	States the name of the city where the mail recipient can be located.	n/a	fhpm	
State	Character	States the name of the state where the mail recipient can be located.	AL, FL, LA, MS, TX, GA, MD, NC, SC	fhpm	
Zipcode	Numeric	States the 5-digit zipcode where the mail recipient can be located.	1-99999	fhpm	
CHG	Numeric	Indicates a particular type of fishing permit.	1, 0, -8	fhpm	Permits used in Gulf of Mexico region
RCG	Numeric	Indicates a particular type of fishing permit.	1, 0, -8	fhpm	Permits used in Gulf of Mexico region
CDW	Numeric	Indicates a particular type of fishing permit.	1, 0, -8	fhpm	Permits used in South Atlantic region
CHS	Numeric	Indicates a particular type of fishing permit.	1, 0, -8	fhpm	Permits used in South Atlantic region
SC	Numeric	Indicates a particular type of fishing permit.	1, 0, -8	fhpm	Permits used in South Atlantic region
Notes	Character	States any important details, specifications, or significant changes in information.	n/a	fhpm, vessel, fees	
Vessel Ft	Numeric	States the length of the vessel measured in feet.	-8-99999	vessel	Did not include vessel 2011 information in Gulf of Mexico data
Vessel Hp	Numeric	States the horsepower of the vessel.	-8-99999	vessel	Did not include vessel 2011 information in Gulf of Mexico data
Type	Numeric	Indicates the type of vessel (charter, headboat, or mixed rates)	0, 1, 2, 3, -8	vessel	Did not include header in South Atlantic data
Calendar	Numeric	Indicates whether a trip calendar was present on the website.	0, 1, -8	vessel	Did not include header in South Atlantic data
Vessel Port/City	Character	States the city in which the vessel was located.	n/a	vessel	There is no header for 2011 Gulf of Mexico vessel marina information.
Vessel Marina	Character	States the name of the marina in which the vessel was located.	n/a	vessel	There is no header for 2011 Gulf of Mexico vessel marina information.
Website	Character	States the name of the website where the vessel's information was located.	n/a	vessel	There is no header for 2011 Gulf of Mexico vessel website information.
Saved Website	Character	Indicates whether the vessel''s corresponding website was saved elsewhere.	Y, N, -8	vessel	
Dolphin	Numeric	Indicates whether the vessel's corresponding website confirmed whether dolphin (mahi mahi) was a target catch species.	1, 0, -8	vessel	
Wahoo	Numeric	Indicates whether the vessel's corresponding website confirmed whether wahoo was a target catch species.	1, 0, -8	vessel	

Groupers	Numeric	Indicates whether the vessel's corresponding website confirmed whether grouper was a target catch species.	1, 0, -8	vessel	
Snappers	Numeric	Indicates whether the vessel's corresponding website confirmed whether snapper was a target catch species.	1, 0, -8	vessel	
Mackerels	Numeric	Indicates whether the vessel's corresponding website confirmed whether mackerel was a target catch species.	1, 0, -8	vessel	
Billfish	Numeric	Indicates whether the vessel's corresponding website confirmed whether billfish was a target catch species.	1, 0, -8	vessel	
Permit	Numeric	Indicates whether the vessel's corresponding website confirmed whether permit was a target catch species.	1, 0, -8	vessel	
Jacks	Numeric	Indicates whether the vessel's corresponding website confirmed whether jack was a target catch species.	1, 0, -8	vessel	
Cobia	Numeric	Indicates whether the vessel's corresponding website confirmed whether cobia was a target catch species.	1, 0, -8	vessel	
Tuna	Numeric	Indicates whether the vessel's corresponding website confirmed whether tuna was a target catch species.	1, 0, -8	vessel	
Error Notes	Character	Indicates that a discrepancy occurred in a particular field when researched at different times or by different students.	v, (blank)	vessel	
Hours	Numeric	Indicates the trip duration in hours.	-8-99999	fees	Did not include 2011 header in Gulf of Mexico data
Fee	Numeric	Indicates the fee associated with each trip in US dollars.	-8-99999	fees	Did not include 2011 header in Gulf of Mexico data
Filet	Numeric	Indicates whether the price for the vessel operators to clean or filet the fish catch is included in the fee.	-9, -8, -1, 0.35, 0.38, 0.45, 0.5, 1	fees	Fillet field was not created for 2011.
Max Passengers	Numeric	Indicates the vessel's maximum number of passengers that can be taken per trip.	-8-99999	fees	Did not include 2011 max passengers header in Gulf of Mexico data
Per Person	Numeric	Indicates whether the listed fee is per individual (a headboat).	0, 1, -8		Per person field was not created for 2011.